Operating Instructions

Vibratory Sieve Shaker

"analysette 3"

Vibration Micro-Pulveriser

"pulverisette 0"

The "analysette 3" is a vertically vibrating laboratory throw-principle sieve shaker for the exact separation and classification of grain sizes. Dry powders as well as particles suspended in a liquid can be analysed as to their size. Depending upon the charged quantity and the particle size distribution, sieves and pans with many different diameters and heights can be placed on the sieve shaker. Dry and/or wet sieving is possible with metallic woven mesh sieves or plastic sieves. Micro-precision sieving is possible with galvanic produced micro-precision sieves.

The throw-principle sieve shaker can be converted into a micro-pulveriser "pulverisette 0" and is therefore also suitable for the micro-milling of laboratory samples ("pulverisette 0" see paragraph 10).

1. Method of operation

The plastic housing contains an electronically controlled electromagnet which is mounted on a sturdy cast base. This electromagnet vibrates the vibrating plate which is connected to the base by 3 permanent-elastic leaf springs. 3000 vibrations per minute are vertically transmitted to the plate. The vibration intensity (amplitude) can be continuously selected up to 3 mm. (When using micro-precision sieves, the vibrating plate is vibrated at a set (constant) amplitude with 6000 vibrations per minute).

An additional electronic control permits to interrupt the sieving process after a preset time for about 2 seconds (interval setting). This reduces considerably the sieving time especially when sieving very light substances (i. e. flour, plastics, etc.).

2. Setting up the sieve shaker

The sieve shaker should be placed on an even, stable surface. It is not necessary to fix it to its position but the instrument must be easily accessible and a sufficient free place for placing the sieves next to the shaker must be available.

The instrument rests on 3 spring loaded feet (16). These feet allow to level the instrument in order to obtain a uniform distribution of the sieving substance on the total sieving surface.

3. Power supply

3.1 Checking for proper voltage and current

Before connecting the sieve shaker you must compare the voltage and current indications on the serial plate of the instrument with the values of your network:

110/220 V A. C. with earth, 50 respectively 60 Hz;
fuse max. 16 A

3.2 Electric fuse

The instrument fuse is positioned on the printed circuit board of the electronic control module. To replace a fuse, first withdraw respectively unscrew the control knobs from the front plate. Then unscrew the screw behind the amplitude control knob and the 4 screws connecting the front plate with the housing. Underneath the instrument unscrew the 2 screws connecting the plastic support of the electronic module with the cast base. Then pull down the support and the fuse is accessible.

Replacement: fuse 2 A slow 5 x 20

Attention:
before opening the instrument, plug out the main connection!!!

4. Operating elements

Timer
position "off"
position "continuous operation"
selection sieving time 0 to 60 minutes

Amplitude control
1 - 10: the vertical vibration intensity is continuously selectable (0 to 3 mm) and can be controlled while the instrument is operating at the intersection of the two middle lines of the scale in "mm" (example below 1.3 mm)

Interval setting
0 - 6: interruption of the sieving process for about 2 seconds. The time period between the interruptions is stepless settable.

Function switch
"inter": 3000 vibrations per minute, amplitude control, interval setting

"perm": 3000 vibrations per minute, amplitude control, no interval setting

"micro": 6000 vibrations per minute, amplitude constant (fixed), no interval setting

5. Positioning the sieve stack

The vibrating plate can accept up to

8 sieves 50 mm respectively 2" height or
16 sieves 25 mm respectively 1" height,

plus the sieve pan and the sieve head. The sieves are stacked on upon the other and seal rings are placed between them (increasing mesh openings to the top).

After having placed the sieve stack on the vibrating plate (5), the tension belt system (11) is hang into the sieve head (4), the toothened belts are guided through the clamping feet (14) and fixed with the lever (13). By turning the star screws (11) to the right (clockwise), the sieve stack is uniformly and firmly tightened (the toothened straps should be tight as a string after the tightening).

Attention:

For safety sake, reduce the vibration intensity of the shaker to the lowest setting before switching it on. Once it is switched on, the timer will ensure that the vibration intensity is slowly increased to the optimal level. Very fine sieves are particularly susceptible to damage in the event of a surge when the shaker is switched on.

6. Dry sieving

When dry sieving, the sieves are placed on a dry sieve pan (without outlet). Then the substance to be sieved is placed on the top sieve, the sieve head is placed on the top sieve and the sieve stack is fastened (see paragraph 5).

To reduce the sieving time, "sieving aids" can be placed in every sieve with meshes larger than 30 µm.

(Agate balls 10 mm in diameter: 10 per sieve
Order No. 55.010.05
or rubber balls 20 mm in diameter: 5 per sieve
Order No. 31.018.15)

7. Wet sieving

When wet sieving, the sieves are placed on the wet sieve pan (with outlet and evacuation tube). The substance to be sieved should have been dispersed in suspension as well as possible - using a wetting agent if necessary. It is now poured onto the top sieve and the wet sieve head is fastened in place.

Attention:

Make certain that the sieve rings provide a tight seal!

7.1 Supply of the rinsing liquid

The rinsing liquid (i. e. water, alcohol, etc.) is supplied by connecting a tube to the quick coupling device in the centre of the wet sieve head. The quantity of the liquid must be determined in order to avoid a backwater. The maximum quantity of the liquid is limited by the 3 spray nozzles in the wet sieve head (approx. 1.5 litres/min at about 2 bar).

A uniform, steady pouring out of the liquid out of the wet sieve pan is an indication of a good distribution of substance to be sieved and liquid.

If the liquid stops pouring out of the wet sieve pan, then this indicates a backwater in one of the sieves. This can lead to overpressure in the sieve stack and to damaging the woven mesh of the sieves. In such a case you must remove immediately the plastic screw in the center of the perspex dome of the wet sieve head.

Remark:
That hole can also be used to add some wetting agent if after some minutes of sieving the wetting agent should have been rinsed out by the liquid.

7.2 Wet sieving of substances difficult to sieve

When substances which are difficult to sieve should be sieved wet you should reduce the quantity of the substance to be sieved and select a more narrow range of the mesh openings of the sieves. When wet sieving a suspension beeing smaller than 200 µm, it is recommended to sieve the individual fractions.

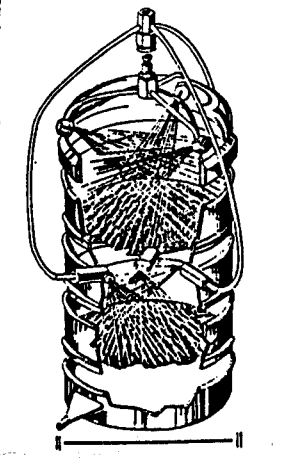
Even if a sieve stack has already been placed and the sieving has been started, the sieving of individual fractions can still be made.

When the sieving of the top sieve is finished (no more smaller particles than the mesh openings remain on the sieve), the wet sieve head is removed and the top sieve is taken away. The wet sieve head is then placed on the underneath sieve. This ensures that the sprays of the nozzles are directly concentrated on the substance to be sieved and that the sieve surface and the substance are much better rinsed. The spray nozzles are positioned in a way to ensure that the substance is sprayed from the inside edge of the sieve towards the centre and that also the inside of the sieve frame and the dome of the wet sieve head are permanently rinsed and kept free from deposits of substance.

7.3 Wet sieving with interposed spray ring

When wet sieving difficult to sieve substances, an interposed spray ring can be placed on a lower sieve in order to avoid a backwater. After the connection of such a ring to the tube system, 3 spray nozzles of the ring additionally spray liquid on a problematic sieve fraction and thus counteract a possible backwater.

If required, up to two interposed spray rings (plus the wet sieve head) can be inserted into the sieve stack and connected to the liquid supply.



7.4 Collecting the smallest particles

If eventually the smallest particle size (the one coming through the sieve with the smallest mesh openings) has to be collected, then the evacuation tube can for instance be connected to a suction filter.

8. Cleaning the sieves

To ensure that the sieves are thoroughly cleaned, we recommend using the ultrasonic bath "laborette 17" and placing the sieves in it in an upright position or upside down. Brushes can damage the woven mesh gauze and should only be used for stronger, large-mesh sieves.

(Wherever possible, the sieves should be cleaned after each use.)

The sieves can be dried in a drying oven at max. 95°C. (The drying time can be reduced by rinsing the sieves with alcohol beforehand.)

9. Sieving with micro-precision sieves

Only small quantities can be sieved with micro-precision sieves: A few hundred milligrams to no more than a few grams can be sieved, depending on the particle size distribution and the mesh size of the sieve. The suitable feed quantity is ascertained through experimentation.

When sieving with micro-precision sieves, set function switch 4 to the "micro" position. Sieving is carried out at a constant vibration intensity.

9.1 Assembling the sieve stack

The vibrating plate of the instrument has 3 screw threads which are closed by plastic inserts. Remove these 3 plastic parts.

Then the funnel can be fastened to the vibrating plate with the 3 spanners and knurled screws. The funnel should be well centered on the vibrating plate. (The 3 spanners are then laying on the lower edge of the funnel and on the vibrating plate).

Then fasten the first spacer to the funnel with a fast locking clamp.

9.1.1 Wet sieving

Special instructions must be observed when wet sieving with micro-precision sleeves:

Mount the funnel and the spacer as for dry sieving. The evacuation tube has to be closed with a tube clamp.

The unit is switched on with timer 1.

Attention:

Afterwards, fill the funnel and the spacer with fluid to a point over the O-ring. Insert the sieve at an angle, with the **sieve foil at the bottom.**

If a number of sieves are to be used for sieving in the sieve tower, assemble these in the same manner.

Attention:

The inflow and outflow of the liquid has to be controlled so that the sieve tower remains full during the entire sieving operation.

After the sieving in the top sieve is ended, lower the level of the liquid to the level of the sieve foil, close the outlet again and remove the lid of the sieve together with nozzle, spacer and sieve. Afterwards, replace and tighten the lid and the sieve out the following sieve.

9.2 Cleaning the micro-precision sieves

Attention:

handle the sieves very gently!!!

For the thorough cleaning of the micro-precision sieves we recommend the ultrasonic bath "laborette 17". However, the micro-precision sieves MUST NOT be placed directly into the ultrasonic bath, but in a glass container (i. e. a beaker glass with a wall thickness of about 4 mm). When placing the micro-precision sieves directly into the bath or when using a glass with a smaller thickness, the ultrasonic cleaning can lead to a damage of the micro-precision foils. Place the micro-precision sieve - **the foil to the top** - in the cleaning liquid.

The glass beaker with the sieve is placed into the insert tray of the ultrasonic bath. Before switching on the ultrasonic bath, you must check the height of the liquid in the bath. It should be about 3-5 cm below the upper edge of the bath in order to reach a good coupling with the ultrasonic energy.

Do not operate the ultrasonic bath longer than 3 minutes when cleaning the micro-precision sieves.

10. Conversion to micro-pulverizer

When using the sieve shaker as a micro-pulveriser, the grinding mortar is placed into the recess of the vibrating plate and the grinding ball is placed into the mortar bowl. Then charge the substance to be pulverized, place the lid on the mortar bowl, hang-in and pre-fasten the toothened tightening belts and firmly tighten them by turning the star knobs to the right.

Best possible grinding results are obtained at lower to middle amplitude setting, because the milling frequency of the grinding ball is the highest at such a setting.

Attention:

For safety sake, reduce the vibration intensity of the micro-pulveriser to the lowest setting before switching it on. Once the pulveriser is switched on, the timer ensures that the vibration intensity is slowly increased to the optimal level.

Failure to do so could result in the grinding balls on the material to be ground bouncing against the lid and destroying it in the event of a surge when the pulveriser is switched on.

The amplitude setting (vibration intensity) selected for grinding samples must permit the balls on the material to be ground to bounce. The measurement arrow on the lid is used to set, limit and control the intensity. The point of intersection of the middle lines indicates the intensity in "mm" during operation.

Between 0.1 to 10 cc of the substance to be ground can be placed in the mortar bowl dry or in suspension. The tight seal of the lid prevents any material losses due to splashing or dust formation.

The obtainable final size with the micro-pulveriser - depending upon the grindability of the sample and the milling time - is around 95 % smaller than 10 to 20 µm. In some cases also final sizes of smaller than 10 µm can be reached.

11. MAINTENANCE

Apart from the necessary regular cleaning, the sieve shaker and micro-pulverizer require no maintenance.

The following situation may arise after protracted operating time:

1) The material to be sieved no longer spreads evenly over the sieve surface or

2) the maximum vibration intensity of approx. 3 mm is no longer achieved.

The first difficulty can be rectified by adjusting the spring-loaded feet. If this does not suffice, the screws holding the permanent-elastic springs must be tightened, as in the second case. To do so, loosen the three screws in the middle of the vibrating plate and lift it. Then uniformly tighten the fastening screws at the outer end of the springs.

Use torque wrench: target value 14 Nm (equal to about 1.4 kpm)

12. Guarantee

The guarantee card supplied together with this instrument must be returned to the manufacturer, duly filled out. This is an absolute must as otherwise the guarantee will not become effective.

We, FRITSCH GMBH, Manufacturers of Laboratory Instruments, Industriestraβe 8, D-6580 Idar-Oberstein, West Germany, and our application laboratory respectively our agent in your country are at your full disposal to help if your FRITSCH instrument should not give you entire satisfaction.

Please do not forget to mention the full serial number of the instrument in the case of any queries.

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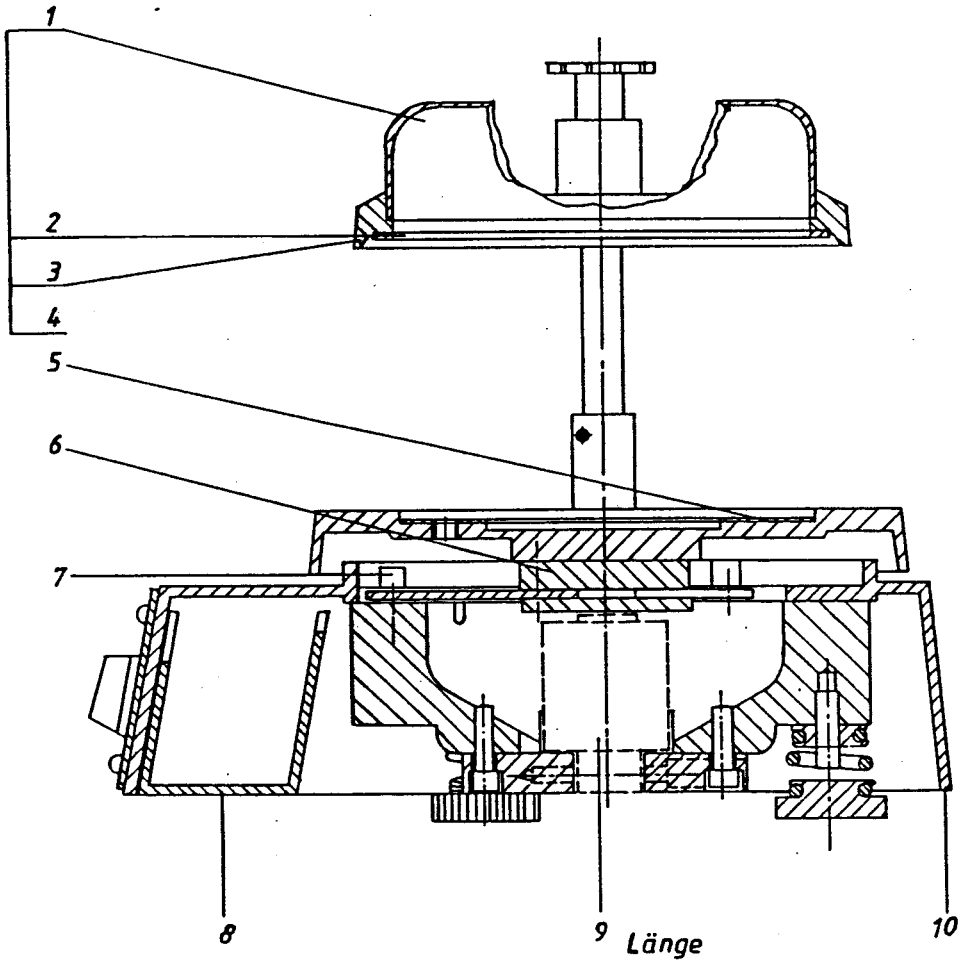
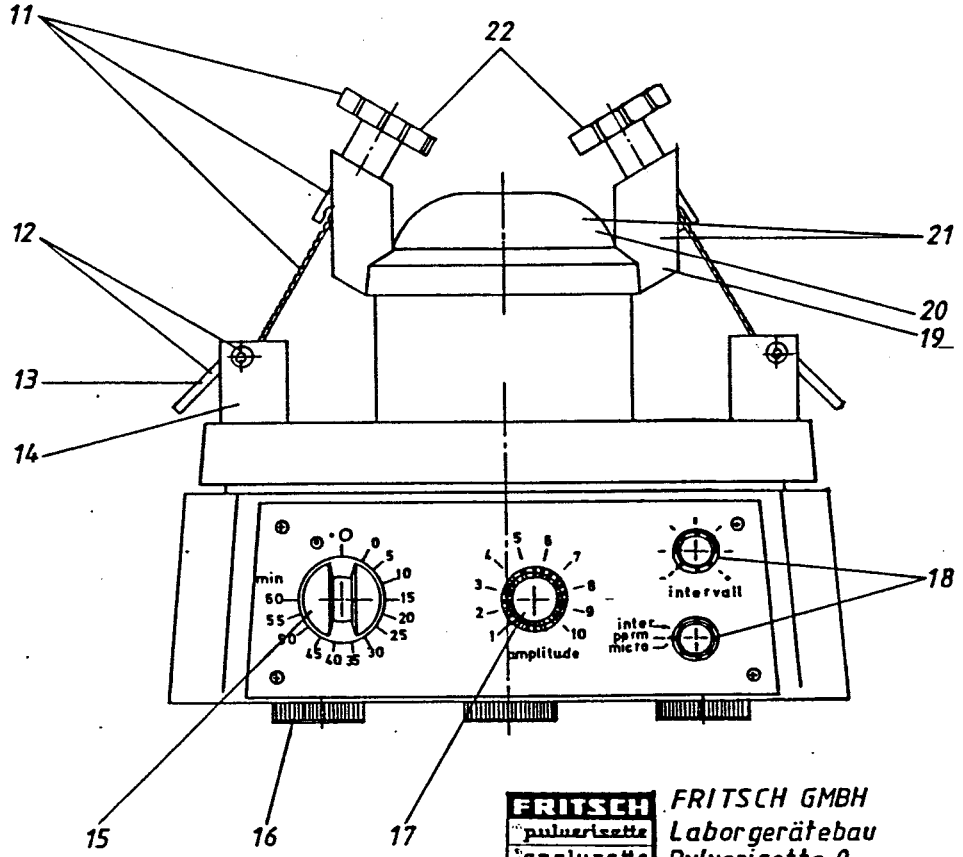
ERSATZTEILLISTE VIBRATIONS-SIEBMASCHINE UND -MIKROMUEHLE
SPARE PARTS LIST VIBRATORY SIEVE SHAKER AND -MICRO PULVERIZER

4.3.87

A-3/P-0 220V / 110V

NR.	ARTIKELNR.	BEZEICHNUNG	DESCRIPTION	ME	PREIS/ME IN DM
		A) GEMEINSAME TEILE	A) COMMON PARTS	S	
5	03.112.15	Gummiplatte	rubberplate	S	
6	03.124.00	Federkreuz f. 60Hz, kpl.	spring assembly f. 60Hz, cpl.	S	
	03.123.00	Federkreuz f. 50Hz, kpl.	spring assembly f. 50Hz, cpl.	S	
7	90.042.00	Schraubensatz, 110V	set of screw f. springs 60Hz	S	
	90.041.00	Schraubensatz, 220V	set of screw f. springs 50Hz	S	
8	81.105.00	Elektronik, kpl., 110V WS	electronic module, cpl., 110V AC	S	
	81.106.00	Elektronik, kpl., 220V WS	electronic module, cpl., 220V AC	S	
9	81.003.00	Elektromagnet, 110V / 30Hz	electro-magnet, 110V / 30Hz	S	
	81.002.00	Elektromagnet, 220V / 25Hz	electro-magnet, 220V / 25Hz	S	
10	03.100.16	Gehaeuse	housing	S	
11	03.120.00	Spanngurt (Zahnriemen, Sterngriff)	tension belt, cpl.	S	
12	03.121.00	Spanner f. Spanngurt	tightener f. tension belt	S	
13	03.105.14	Spannhebel f. Spanngurt	lever f. tension belt	S	
14	03.106.14	Spannfuss f. Spanner	clamping foot f. tightener	S	
15	81.877.00	Drehknopf f. Zeitschalter	knob for timer	S	
16	03.122.00	Federfuss, kpl.	spring foot, cpl.	S	
17	81.806.00	Drehknopf, gross (Potl)	control knob for amplitude	S	
18	81.807.00	Drehknopf, klein	control knob for operation mode	S	
22	92.603.00	Sterngriff, M10, ø=50 mm	star grip screw, M10, ø=50 mm	S	
		B) A-3 TEILE	B) A-3 PARTS	S	
1	31.014.17	Plexiglaskuppel f. Trockensiebkopf	dome safety glass f. dry sieving head	S	
2	31.017.16	Dichtring fuer Siebkopf	seal ring for sieving head	S	
3	31.022.13	Deckelfassung fuer Siebkopf	lid frame of sieving head	S	
4	31.202.00	Trockensiebkopf, kpl.	dry sieving head	S	
		C) P-0 TEILE	C) P-0 PARTS	S	
19	00.100.13	Deckelfassung	mounting for lid	S	
20	00.011.17	Haube, Plexiglas	hood, safety glass	S	
21	31.201.00	Deckel	lid	S	

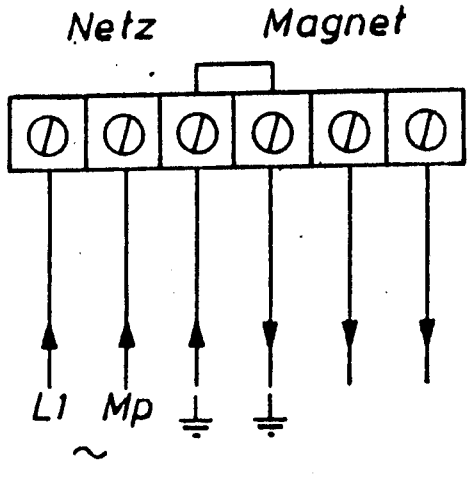




Länge
Length = 335 mm
Breite
Width = 270 mm
Höhe
Height = 200 mm

FRITSCH
pulverisette
analysette
laborette

FRITSCH GMBH
Laborgerätebau
Pulverisette 0
Analysette 3
Labormikromühle
Laborsiebmaschine
4.3.87



Lfd Nr	Stück-zahl	Benennung	Sach-Nr.	Bemerkungen

Gemäß dem Urheberrechtsgesetz vom 19. 6. 1901 stehen uns zu Die Zeichnung darf weder vervielfältigt noch dem Wettbewerb oder Dritten zugänglich gemacht werden (Gesetz vom 7. 6. 1908)

Freimaßtoleranzen nach DIN 7168
☐ fein
☐ mittel
☐ grob

Teil Nr

	Tag	Name
Bearb	3.11.81	Koch
Gepr		
Norm		

Werkstoff

FRITSCH GMBH
IDAR-OBERSTEIN

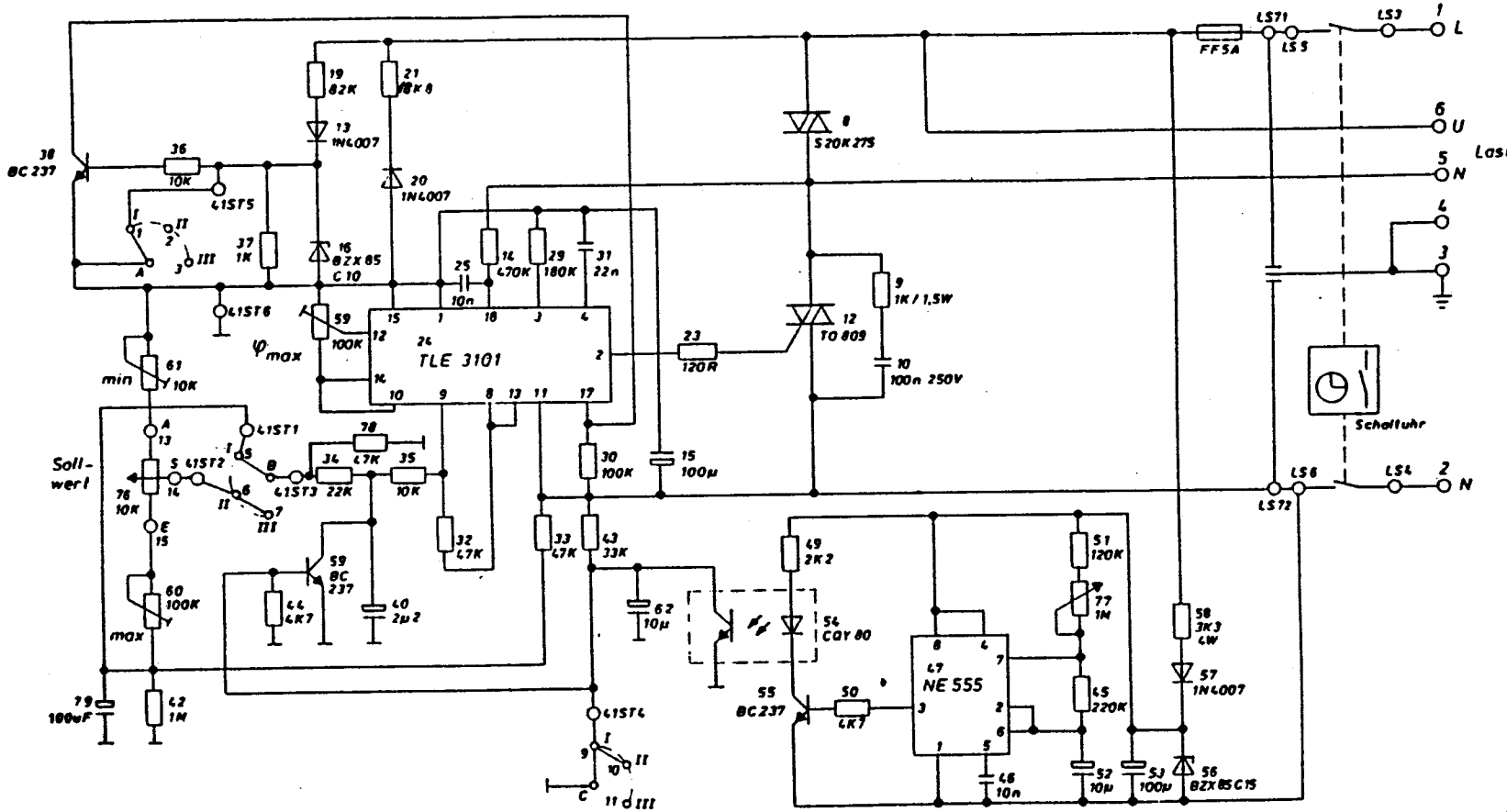
FRITSCH
pulverisette
analysette
laborette

Benennung
Anschlußklemmen a3, p0

Maßstab

Zeichn.-Nr

Typ



Lfd. Nr	Stück-zahl	Benennung	Sach-Nr	Bemerkungen

Ein Recht aus Sonderschutzgesetz vom 13.9.1901 stehen uns zu. Eine Verfügung darf weder vervielfältigt noch dem Wettbewerb einer Person zugänglich gemacht werden. Gesetz vom 7.9.1909

Fremdfabrikat nach DIN 7168: ☐ roh ☐ metall ☐ prob

Teil Nr

	Tag	Name
Bearb	15.10.87	
Gepr		
Norm		
Werkstoff		

Aus-gabe	Änderung	Tag	Name

FRITSCH GMBH
IDAR-OBERSTEIN

FRITSCH pulverizette analysette laborette

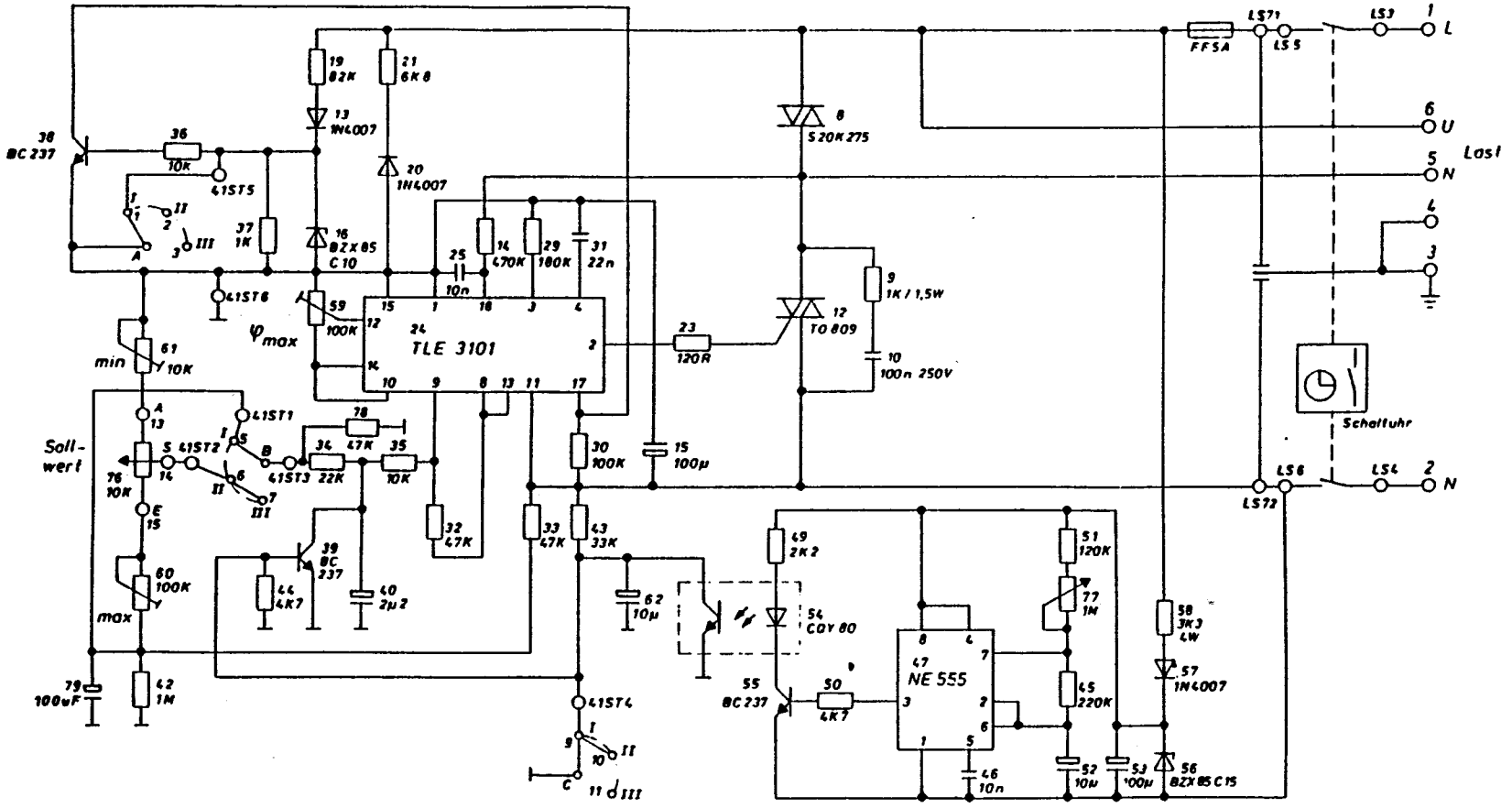
Benennung: THYRISTORSTEUERUNG 220V

Maßstab

Zeichn.-Nr: 81.104.00

Typ: A31 P0

Ersetzt durch



Lfd. Nr.	Stück-zahl	Benennung	Sach-Nr.	Bemerkungen

Fremdfirmennorm nach CN 7158: ☐ fein ☐ mittel ☐ grob

Tol.-Nr.

	Tag	Name
Gezeichnet	15.10.87	
Gepr.		
Norm		
Werkstoff		

FRITSCH GMBH
IDAR-OBERSTEIN

FRITSCH pulverisette analysette laborette

Benennung: THYRISTORSTEUERUNG 110V

Maßstab

Zeichn.-Nr.: 81.103.00

Typ: A31 P0

Ersetzt durch

Ausgabe	Änderung	Tag	Name